

REMARKS

Favorable reconsideration of this application in light of the following discussion, is respectfully requested.

Claims 9-20 are pending. No claims are added, amended or canceled. Therefore, no new matter is introduced.

In the outstanding Office Action, Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over the Background in view of Feld (U.S. Patent No. 6,281,755); Claims 10-11 and 17-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Background in view of Feld and Kaczynski (U.S. Patent Application Publication No. 2007/0111684); Claims 12-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Background in view of Feld, Shohara (U.S. Patent Application Publication No. 2005/0078743) and Wilhelmsson (U.S. Patent Application Publication No. 2007/0211831); Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over the Background in view of Kasuga (U.S. Patent No. 4,524,422); Claims 15-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Background in view of Feld, Kasuga and Daners (U.S. Patent No. 6,229,393); Claims 19-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Background, Kasuga, Shohara and Wilhelmsson; and Claim 21 was objected to for depending from a rejected base claim, but otherwise indicated as allowable.

The indication of allowable subject matter is gratefully acknowledged. For the reasons below, all claims are believed to be in condition for allowance.

The rejection of Claim 9 as being unpatentable over the Background in view of Feld is respectfully traversed. Claim 9 is directed to a wide-band amplifier that includes:

- an input terminal configured to receive an input voltage;
- an output terminal configured to provide an amplified output voltage;

an amplification device connected in series between the input terminal and the output terminal, an output of the amplification device being directly connected to the output terminal;

an LC parallel resonant circuit connected between the output terminal and a ground terminal in parallel to the amplification device; and

an LCR series resonant circuit connected *between the output terminal and the ground terminal in parallel to the amplification device* and the LC parallel resonant circuit.  
(Emphasis added.)

As discussed in previous responses, the Background merely describes a conventional amplifier with an inductor ( $L_p$ ), a capacitor ( $C_p$ ) and a resistor ( $R_L$ ) all connected in parallel to an amplification device (102).<sup>1</sup> However, the outstanding Office Action concedes that the Background does not describe the claimed LCR series resonant circuit recited in Claim 9.<sup>2</sup> Instead, the outstanding Office Action identifies Feld as describing this feature.

Feld, however, merely describes a high-frequency power amplifier that feeds an antenna of a nuclear magnetic resonance tomography apparatus.<sup>3</sup> In Figure 2, Feld illustrates the power amplifier as having an input ( $\mu_{st}$ ) connected to a matching network (4), which, in turn, is connected to the input of an amplifier stage (2), whose outputs is connected to the antenna represented by load guideline value ( $G_L$ ) via a matching network (8).<sup>4</sup> Feld describes that the high-frequency load ( $G_L$ ) is matched to the output resistance of the amplifier stage (2) using the matching network (8).<sup>5</sup> In Figure 5, Feld illustrates the matching network, which is connected in series between the amplifier stage (2) and the antenna load ( $G_L$ ) as including a parallel resonance circuit (20) and a series resonant circuit (22) both connected between the antenna load ( $G_L$ ) and the amplifier stage (2).<sup>6</sup> In other words, the circuit described in Feld

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<sup>1</sup> See Figure 8 of the Background.

<sup>2</sup> See the outstanding Office Action at page 3.

<sup>3</sup> Feld at column 2, lines 55-60.

<sup>4</sup> Feld at column 5, lines 40-60.

<sup>5</sup> Feld at column 5, lines 28-30.

<sup>6</sup> Feld at column 6, lines 45-52.

includes a series resonant circuit (22) which places a capacitor ( $C_s$ ) and an inductor ( $L_s$ ) in series between the output of the amplifier stage (2) and the output of the high-frequency amplifier, which is measured at the antenna load ( $G_L$ ).<sup>7</sup> In fact, Feld requires that at least the capacitor ( $C_s$ ) be in series between the amplifier stage (2) and the antenna ( $G_L$ ) to separate DC voltages from the antenna, providing electrical safety.<sup>8</sup>

The outstanding Office Action, however, attempts to modify the impedance matching network (8) of Feld by taking the output of the high-frequency amplifier described in Feld as being the point between the parallel resonant circuit (20) and the series resonant circuit (22), rather than at the antenna load ( $G_L$ ) as described in Feld.<sup>9</sup> However,

The mere fact that references can be combined or modified does not render the resultant combination obvious unless \*\*>the results would have been predictable to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 82 USPQ2d 1385, 1396 (2007).

Thus, the mere fact that the Examiner is able to contort the Feld reference to allegedly describe the LCR resonant circuit does not render Claim 9 obvious unless the resulting modification and/or combination would have been predictable to one of ordinary skill in the art at the time that the invention was made.<sup>10</sup>

Feld, however, defines the topology of the matching network (8) in order to maximize peak power in the specified frequency ranges.<sup>11</sup> To this end, Feld chooses the values of the inductor ( $L_p$ ) and the capacitor ( $C_p$ ) of the parallel resonant circuit (20), and the values of the inductor ( $L_s$ ) and the capacitor ( $C_p$ ) of the series resonant circuit (22) to maximize peak power transfer to the antenna, represented by the load guideline ( $G_L$ ).<sup>12</sup> The values of these

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<sup>7</sup> See Figure 5 of Feld.

<sup>8</sup> Feld at column 7, lines 44-47.

<sup>9</sup> See the outstanding Office Action at page 3.

<sup>10</sup> Whether an art is predictable or whether the proposed modification or combination of the prior art has a reasonable expectation of success is determined at the time the invention was made. *Ex parte Erlich*, 3 USPQ2d 1011 (Bd. Pat. App. & Inter. 1986)

<sup>11</sup> Feld at column 5, lines 19-40.

<sup>12</sup> Feld at column 6, line 54-column 7, line 5.

circuit components are directly dependent on the circuit topology, including where the peak power is to be delivered (i.e. the antenna load ( $G_L$ )). Further, Feld expressly requires that at least a capacitor ( $C_s$ ) be connected in series between the output of the amplifier stage (2) and the overall output of the high-frequency amplifier as measured across the antenna load ( $G_L$ ) to maintain electrical isolation.<sup>13</sup> Therefore, the Examiner's proposed modification to Feld would not have been predictable because they would require significant alterations in the circuit topology and component values that contradict the express descriptions in Feld of providing maximum peak power to the antenna load ( $G_L$ ) while maintaining good electrical isolation.

Furthermore, the proposed modification to Feld would change the principle of operation of the high-frequency power amplifier described therein, as the output would now be directly taken from the output of the amplifier stage (2) instead of the output of the series resonant circuit (22). In this regard, M.P.E.P. §2143.01 states that,

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Thus, the Examiner's proposed modifications to Feld would fundamentally change the principle of operation of the high-frequency amplifier described therein as maximum peak power would be delivered across the series combination of the inductor ( $L_s$ ), capacitor ( $C_s$ ) and antenna load ( $G_L$ ), not the antenna load ( $G_L$ ) itself. Moreover, the output of the amplifier stage (2) would not be electrically isolated from the overall output of the high-frequency amplifier as required in Feld. As such, the proposed modifications to Feld would not have been obvious for this additional reason.

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<sup>13</sup> Feld at column 7, lines 44-47.

In addition, the Background describes a wide-band amplifier. However, Feld describes that the high-frequency power amplifier operates within two operating frequency bands that are relatively narrow.<sup>14</sup> In fact, Feld describes that the output matching network (8) cannot sustain the intended characteristics over a large, continuous frequency range.<sup>15</sup> In other words, Feld describes its own circuit as being limited to narrow-band applications and being wholly unsuitable for wide-band applications. Were the Background to be combined with Feld, the resulting combination would be unsatisfactory for the purpose of wide-band amplification because the output matching network (8) described in Feld is only accurate over narrow frequency ranges. As the Office is no doubt aware,

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or modification to make the proposed modification. *In re Gorden*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

Thus, one of ordinary skill in the art would not have considered combining the Background with Feld as such a combination would alter the principle of operation in Feld as well as render the resulting amplifier unsatisfactory for wide-band applications. In fact, to arrive at the modifications and combinations proposed by the Examiner, a person of ordinary skill in the art would have to resort to impermissible hindsight reconstruction based upon a reading of Applicants' disclosure as nothing in the Background or Feld discloses or suggests using a narrow-band circuit for wide-band applications or modifying the narrow-band circuit to derive an output from a point other than that discussed in Feld. Therefore, for the reasons discussed above, it is believed that the rejection of Claim 9 under 35 U.S.C. §103(a) is improper and should be withdrawn.

Moreover, the rejections of Claims 10-13 rely upon Feld for describing the above-distinguished features, but as discussed above, Feld does not disclose or suggest the above-

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<sup>14</sup> Feld at column 5, lines 5-8.

<sup>15</sup> Feld at column 3, lines 35-44.

distinguished features, alone or in combination with any other art of record. Therefore, it is respectfully requested that the rejection of Claims 10-13 under 35 U.S.C. §103(a) be withdrawn.

As to the rejection of Claim 14, this rejection is also respectfully traversed.

Claim 14 is directed to a wide-band amplifier that, *inter alia*, includes:

an analog band-pass filter connected between the output terminal and a ground terminal in parallel to the amplification device, the analog band-pass filter having a plurality of poles provided on a left side of an s-plane and a plurality of zeros arranged between the poles, at least two zeros being arranged at locations other than an origin of the s-plane.

Thus, Claim 14 defines an analog filter that has at least two zeros arranged at locations other than an origin of the s-plane.

As acknowledged in the outstanding Office Action, the Background does not disclose or suggest these features. Nonetheless, the outstanding Office Action asserts Kasuga as somehow describing an analog filter with the claimed characteristics.

As discussed in previous responses, Kasuga merely describes a digital equalizer that has poles and zeros arbitrarily arranged around a circle whose radius is the center angular frequency of a desired filter characteristic.<sup>16</sup> To obtain such characteristics, Kasuga illustrates the digital filter as including a register (21), four delays (22, 23, 30, 31), a multiplier (25), an adder (27), a register to provide feedback to the adder (28) and a central processing unit (33). Thus, Kasuga describes placing poles and zeros at arbitrary positions using a digital circuit operating under entirely different principles as the analog circuit illustrated in the Background. Any combination of the Background with Kasuga would necessarily involve incorporating some or all of the digital components described above into the analog circuits of the Background. The resulting filter characteristics would therefore be achieved via digital circuit principles, not analog circuit principles as described in the

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<sup>16</sup> Kasuga at column 1, lines 43-50.

Background. As such, the principle of operation of the Background would fundamentally be changed from that of an analog circuit to a digital one. However, as discussed above, modifications or combinations that change the principle of operation of the reference being modified does not render the claims *prima facie* obvious. As such, the outstanding Office Action fails to present a *prima facie* case of obviousness relative to Claim 14. Therefore, it is respectfully requested that the rejection of Claim 14 under 35 U.S.C. §103(a) be withdrawn.

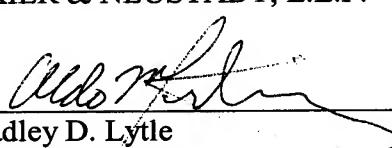
As the rejection of Claims 15-20 rely upon Kasuga for describing the above-distinguished features, and the above-distinguished features are not disclosed or suggested by Kasuga, alone or in combination with any other art of record, it is respectfully submitted that a *prima facie* case of obviousness has not been presented. As such, it is respectfully requested that the rejection of Claims 15-20 under 35 U.S.C. §103(a) be withdrawn.

For the reasons discussed above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a notice of allowance for Claims 9-20 is earnestly solicited.

Should, however, the above distinctions be found unpersuasive, Applicant respectfully requests that the Examiner provide an explanation via Advisory Action under M.P.E.P. §714.13 specifically rebutting the points raised herein.

Respectfully submitted,

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